DOCUMENT RESUME

ED 471 337 EF 006 167

TITLE	Modular Building Institute 1998 Educational Showcase.
INSTITUTION	Modular Building Inst., Charlottesville, VA.
PUB DATE	1998-00-00
NOTE	19p.
AVAILABLE FROM	For full text: http://www.mbinet.org/web/magazine/showcase.html.
PUB TYPE	Collected Works - General (020)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Building Design; Educational Facilities Design; Elementary Secondary Education; Higher Education; *Mobile Classrooms; *Prefabrication; *Relocatable Facilities; School Construction; *School Expansion

ABSTRACT

This publication contains brief articles concerned with modular school structures. Many articles offer examples of such structures at actual schools. The articles in this issue are: (1) "Modular Classroom Additions"; (2) "Heywood Elementary School Project"; (3) "King County Directors Association (KCDA) Signs Contract for Modular Classrooms"; (4) "Freshman Campus at Tuscon, AZ"; (5) "Relocatable Classroom"; (6) "Northridge--The Modular Building Industry & the Reconstruction of California State University" (Lisa Gergen); (7) "Portable Classrooms: The Permanent Solution" (Michael I. Roman); (8) "Virgin Islands Classroom Project"; and (9) "Rosewood, Ohio Project." (EV)

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Modular Building Institute
1998 Educational Showcase

Modular Classroom Additions

Heywood Elementary School Project

King County Directors Association (KCDA) Signs Contract for Modular Classrooms

Freshman Campus at Tuscon, AZ

Relocatable Classroom

Northridge- The Modular Building Industry & the reconstruction of California State University

Portable Classrooms: The Permanent Solution

Virgin Islands Classroom Project

Rosewood, Ohio Project

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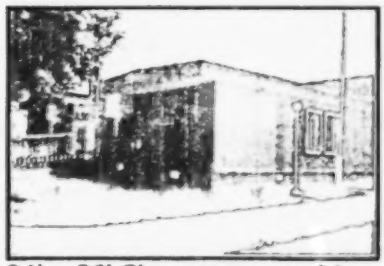
"Modular Classroom Additions"
Bennett's Trailer Company

Modular addition at Hightstown High School, installed in 1985



24' x 36' Classrooms used in Pennsylvania school districts

Modular classroom buildings play an important role in serving the educational needs of our communities. On occasion it is because a natural disaster such as a flood, hurricane, or tornado has destroyed a pre-existing school or made it unsafe. On other occasions it might be because of asbestos in an old school building has made it unsafe for the children and teaching staff. Mostly we see that the reason for the popularity of modular classrooms is that they offer the following:

1. **Low Cost** - Depending on the building specifications and site location, modular classrooms can be manufactured and installed on site at a cost excluding land at 60% or less than the cost of conventional construction. To further reduce the costs, lease programs are available to school districts that anticipate a temporary need for classroom space.

2. **Speed of Completion** - Usually modular classroom buildings can be occupied in less than 150 days from receipt of the order. This time allows for preparation of drawings, ordering materials, plant production, site development, transport, and installation.

3. **Pleasant Learning Environment** - Modular classrooms allow children to learn in a comfortable environment. Unlike most older conventional buildings, modular classrooms usually offer air conditioning, bright wall finishes, and good lighting, all of which are conductive to better learning.

4. **Changing Needs** - Although many modular classrooms buildings are intended to serve as permanent structures most can be dismantled at a reasonable cost and either relocated within the same school district or sold to another district. Classrooms can be leased on a temporary basis to fill anticipated short-term needs. Having the capability of re-locating, selling, returning to lessor or ordering additional classrooms gives a school district the ability to better react to changing

enrollments.

5. **Quality & Longevity** - Modular classrooms range in type from wood frame with plywood floor decking and metal siding to steel frame with concrete floors and masonry exteriors. They are manufactured as large sections or modules in a plant controlled conditions and close inspections. Then they are transported to the job site for final assembly as the completed building. Assuming that they are routinely maintained like any conventional structure, modular buildings have a life expectancy of twenty to forty years or more.

Bennett's Trailer Company has been selling, leasing and installing modular classrooms for more than fifteen years and other modular buildings for even longer. Before modular buildings gained the acceptance that they have today it was common for school district officials to come to us knowing that they had an acute need for temporary classrooms but afraid of the reaction of parents and teachers to "trailers" as all relocatable or modular classrooms were considered at that time. Those fears turned to relief when the teachers requested those air-conditioned classrooms and the students enjoyed their new modern surroundings. As enrollments increased at a faster pace than budgets, school districts continued to order more modular classrooms.

The quality and possible sizes and configurations of these buildings combined with the real need for quick, less expensive additional space has created a significant demand for architectural services in designing these temporary or permanent structures. Partly because of design enhancements by architects, the image and quality of our structures continues to improve. Portable classroom buildings are a lot more than just "trailers".

Examples:

1. In 1991 Bennett's Trailer Company was a warded a $743,000 contract to provide a non-combustible modular classroom addition to an existing school in Pennsylvania. We acted as dealer, general contractor and construction managers on that project which included multiple trades. Based on our good performance on that job we were referred by the engineer to another school district. They needed several small 24' x 36' temporary classrooms on an emergency basis because of an unexpected increase in enrollments. Enrollments continued to boom and that need eventually resulted in a total of twenty-two classroom buildings, all of which are on lease.

2. In 1985 we acted a dealer, general contractor and construction managers to provide and install a 4,500 sq. ft. modular classroom in New Jersey. The project went very well and the school district threw an open house to celebrate the opening. Two years later we easily added 1848 sq. ft. to the same building because we planned for it from the start. An engineer for the school district designed the original building and addition. Throughout the process we were referred to by the school district as Bennet Construction Company - not Bennett's Trailer Company.

3. In 1985 we provided the same services to provide and install a 4,850 sq. ft. modular classroom addition and site constructed corridor to a high school in New Jersey. It was designed by a large architectural firm and one of the requirements was that its brick-faced exterior had to match the brick of the existing site built school. It did match perfectly and the architect subsequently designed many more, all of which were brick-faced.

4. Over the years we have relocated many temporary classroom buildings ranging in size from 24' x 36' to over 7,000 sq. ft. Most often it is within the same school district because wise facilities managers make the best use of what they have if new construction budgets are limited. Many times, however, school districts purchase the modular, complete their capital building projects and then sell their modular classrooms to other school districts. Thereby they recoup much of the initial investment.

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MBI Net > magazine > kullhey98

"Heywood Elementary School Project"
Kullman Industries

12,000 sq. ft. addition at Heywood Elementary School

The Heywood Elementary School project was a 12,000 square foot single story building with a connecting link between the new addition and the existing school. The connecting link had to traverse a ravine which required it to be 2-stories with an opening on the bottom section to allow vehicles to pass through.

As with the Forest Elementary School, the project had the same completion period of 5 months for the total project for both schools.

Since the project had to be completed while school was in session the Orange BOE opted to go with the modular approach because of minimal site disruption and because the project site was located in an urban setting.

The project consisted of 8 new classrooms, library, serving kitchen, storage, and interconnecting links between the new addition and the existing school.

The 2-story connecting link also incorporated an elevator which allowed the existing structure to meet the ADA requirements.

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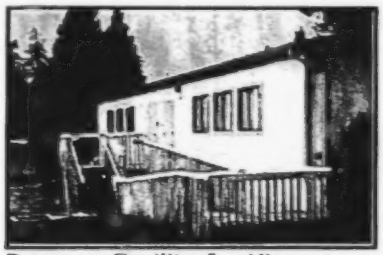
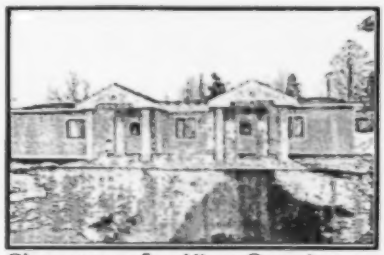
"Modular Classroom Contract"
Mckinney Modile Modular



Daycare Facility for King County Directors Association



Classroom for King County Directors Association

For the past 15 months Mckinney Mobile Modular has held the contract to supply modular classrooms to the public school system throughout the State of Washington. This contract was awarded, and is administered by, the King County Directors Association (KCDA). KCDA just extended the terms of the contract to Mckinney through the end of 1998. KCDA is one of the oldest and largest school purchasing cooperatives of this kind, in the nation.

KCDA is a nonprofit public entity, owned and governed by its membership of 291 public schools throughout the States of Washington, Alaska, and Idaho. By securing competitive bids KCDA has fulfilled this requirement for its members. They also establish pricing based on a large volume of classrooms that any member can use on a single or multiple classroom basis. KCDA'S combined product offering of supplies and services exceeded sixty million dollars in 1997.

Mckinney is administrating this contract from their Auburn Washington branch, with the backing of over 25 years of educational experience. With offices in Washington, Oregon, California, Utah, and Arizona, Mckinney's West Coast influence for their quality product mix is unsurpassed. This product mix includes a large Office Trailer Lease Fleet, Classrooms, and Custom Modular Complexes.

Mckinneys dedication to KCDA and their members has generated an industry benchmark specification for three base models of classrooms. A 28 x 32 Single Classroom, 28 x 64 Double Classroom, and a Daycare Facility that includes all necessities for preschool age children. In this role, Mckinney has blended the demands of facilities personnel in schools with the realism of a quality built well manufactured modular unit.

As Mckinney's provider of Modular Structures, Blazer Industries, of Aumsville, OR, has been instrumental in helping develop the specification requests from these school districts. By incorporating a base design that exceeds the strict Washington State Dept. of Labor and Industries' minimum specifications, member school districts can be assured of receiving the industry's highest quality modular classrooms.

From this base design, KCDA'S member schools then have the option of adding specific

items to enhance the performance of the classroom. These pre-bid options include everything from vinyl windows, electrical upgrades, commercial carpeting, white boards, to restroom upgrades. Mckinney offers over 25 standard upgrades from this option list to help the customer accurately price a complete Modular Classroom. The base price includes delivery and setup of the classroom to most popular areas of Washington.

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"Modular Freshman Campus"
Modular Technology, Inc.

Ninth-grade modular freshman campus at Canyon Del Oro High School, Tucson, AZ

With the addition of a ninth-grade class to Canyon Del Oro High School in Tucson, Arizona, the student population has risen from 2,326 during the 1993-94 academic year to an estimated 3,000 students for the 1998 fall semester. Faced with the pressing issues of overcrowding and severe time constraints, the Amphitheatre School District sought to develop an adjoining modular "freshman campus" comprised of 12 classrooms, a computer lab, and an administrative area. Modular Technology, Inc. (Mod Tech) of Phoenix, Arizona was selected to undertake this project based upon their successful portfolio and fully-integrated structure. At Mod Tech, engineering, manufacturing, installation and site-work improvements are all completed, with single-source management and responsibility, for a turn-key product.

An innovative campus required an innovative approach and Mod Tech worked closely with school administrators to develop an adjoining campus that would allow for architectural, aesthetic, and social integration. Focus was also given to the immediate needs of the campus as well as the long-term, permanent contribution to the school and community. Completed in only 90 days, the resulting 8 modular buildings were equipped with a cost-efficient energy management system, resulting in reduced maintenance costs for the district and taxpayers. The computer lab required intricate wiring and was delivered "network ready" in time for school to start. Benches and landscaping were added to complement the dramatic desert setting, as well as broad walkways to aid convenience and lend a sense of permanence to the campus. In August, 1995 Canyon Del Oro was well-equipped to greet their incoming freshman class and eager to put their new facilities to good use.

Indeed, the modular additions are a permanent contribution to the Amphitheatre District and its community. Parents and administrators agree that the campus has allowed incoming freshmen to adjust to a high school environment in a non-threatening, familial setting. The freshmen students divide their time between the adjoining campuses, which has helped faculty develop parallel curricula focusing on the needs of lower-classmen

and utilizing the technological resources of the computer lab. Originally designed to house only incoming freshman, Canyon Del Oro now has plans to expand this adjoining campus to accommodate sophomore students as well.

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"Relocatable Classrooms"
New Castle Modular

Two new 1,000 sq. ft. relocatable classrooms at Lawrence Township

Relocatable classrooms at Hamilton Southeastern School

On the first day of the 1997/98 school year, New Castle Modular Specialties received a panic phone call from Lawrence Township Schools, Indianapolis, Indiana. During the summer months more families moved into the new housing subdivisions than was forecasted. The nearby elementary school needed two additional classrooms fast.

In four days, New Castle Modular Specialties delivered and installed two 1,000 square foot relocatable classrooms. The students only had to spend a few days using the lunch room as their classroom. This growing school district currently utilizes thirty-nine relocatable classrooms furnished by New Castle Modular Specialties.

The use of relocatable classrooms:

- Architectural and construction time to complete a new school in the northern part of the US is two to three years.
- The children don't stop coming while you are building a school. Where do you put them?
- Relocatable classrooms are an inexpensive, short-term solution to a space problem.
- Flexibility- classrooms can be moved from school to school as conditions change.
- Use relocatable classrooms for a "bubble" going through the school district. A bubble is a large number of students in two or three grades with no increase in students coming after the bubble. Use relocatable classrooms in lieu of expensive permanent construction that will not be needed in the year past the "bubble."

Hamilton Southeastern Schools is the fastest growing school district in Indiana. Over the past eleven years this school district has purchased fourteen relocatable classrooms from New Castle Modular Specialties.

As the community grew, the increasing number of children moved from elementary schools, to the middle schools and then to the high school. The construction of new

schools could not keep pace with the growing number of children.

Each year New Castle Modular Specialties, would move the relocatable classrooms to their next assignment. The process culminated in 1997 when eighteen relocatable classrooms were moved from the high school back to five different schools.

This is an example to the versatility of relocatable classrooms.

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MBI Net > magazine > northr98

"Northridge - The Modular Building Industry & the Reconstruction of California State University"
by Lisa Gergen, Resun Leasing, Inc.

The 1994 California earthquake caused destruction such as shown in this scene from California State University at Northridge.

The January 17, 1994 Northridge Earthquake was the largest and most costly earthquake in U.S. history. Damage was reported over 2,192 square miles of California in Los Angeles, Ventura and Orange counties. Assessed damage costs were estimated in excess of $25 billion. At the earthquake's epicenter was the California State University, Northridge ("CSUN").

A few days after the quake, the entire campus, consisting of 107 buildings, were "red tagged" (inferring entry prohibited) until a damage assessment team could perform a thorough inspection of each building. Once inspected, the individual buildings either maintained the red tag status or were tagged with yellow or green tags representing "proceed with caution", or "entry permitted", respectively. On January 25, the Damage Survey Report (DSR) was completed.

On January 29, a general contractor was hired to oversee reconstruction of the university. While it took more than 30 years to build CSUN, the contractor was to ensure a reasonable functioning facsimile in just 17 days. The general contractor needed to enlist experts in temporary facilities - fast!

On February 5, GE Capital Modular Space, Mobile Modular, and Space Leasing were selected to provide the temporary facilities during the lengthy reconstruction of the entire university. The Industry's challenge was to:

- begin very intense work to get the campus fully restored with a thoroughly modern infrastructure;
- render safe, quick, quality production, on a fast-track schedule that included

around-the-clock work;

- prepare the buildings for their intended usage, i.e. classrooms, laboratories, administrative office buildings, etc.; and
- ensure CSUN's ability to focus on the continuation of academic programs and student services through the availability of facilities.

Twelve different parking lots and intramural fields were cleared to accommodate the "recovery village". Within two weeks from the initial phone call, the mobile building industry delivered 85% of the necessary 360 structures representing 475,000 square feet of space on campus. Buildings came from as far east as Colorado. Approximately 80% of the buildings on site were used for classrooms and laboratories. Remarkably, the campus managed to open the Spring 1994 semester only a few days after the originally schedule date.

To alleviate campus confusion, a detailed site plan was created and supplemental building signage was utilized. To mitigate possible personal injuries due to the devastated terrain, catwalks were fashioned above rubble and collapsed sidewalks to permit access to the buildings.

The first phase out of temporary buildings started in May 1995. Today, 179 temporary buildings are still on site serving the Science Department, Art Gallery, Mail Room, Administrative Offices for three Vice Presidents', weight room, Food Services Department, the Dean's office, and numerous classrooms and laboratories.

Howard Drier, President of Space Leasing stated "Teamwork was critical in the success of this project. There was a spirit of cooperation shared between GE Capital, Mobile Modular, and Space Leasing normally not found amid strong competitors. We put our resources together and got the job completed quickly and professionally."

During a September 1997 interview, James H. Gray, Trustee of CSUN stated, "If you look at the size and scope of the undertaking, it is a phenomenal positive activity and I applaud you for it. You've done a magnificent job under the most difficult kind of circumstances."

This is a prime example of MBI members responded to a monumental challenge.

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MODULAR BUILDING INSTITUTE

"Portable Classrooms: The Permanent Solutions"
by Michael I. Roman, Resun Leasing, Inc.

In November 1993, the Florida Center for Community Design and Research, a research arm of the University of South Florida Master of Architecture Program, published a report of the Florida Department of Education, Office of Educational Facilities entitled "The Use of Relocatable Classrooms in the Public School Districts of Florida." This 148-page annotated report reviewed a substantial amount of existing literature and incorporated those independent conclusions with the results of questionnaires sent to facility planners, superintendents and teachers in each of the 67 public school districts in Florida, site visits to manufacturing plants and schools as well as discussions with principles, teachers and industry representatives.

The report investigated the use of portable classrooms as a cost efficient and educationally effective means of handling the on-going short fall of permanent facilities. The report focused on construction methodology, facility planning, the physical classroom environment including light, air quality, noise levels and safety issues, the impact on existing core facilities and a financial analysis.

Public school districts in Florida have long been a substantial user of factory built classrooms. While the survey and report have been generated in and by Florida, the analysis, conclusions and recommendations are of a much broader interest. There are important lessons in the report for all of us from user to manufacturer, from Maine to California.

Review of Existing Literature

The report identified numerous factors that coincide to create an atmosphere where portable classrooms can be the optimum solution:

- explosive growth in public school enrollments;
- forecast of continued growth for the foreseeable future;
- the difficulty of forecasting intra-district movements;
- dwindling growth in funding for new capital improvements;
- slower growth in tax bases;
- effective caps on school fund mileage rates;
- declining state funding sources;
- increased constituency reluctance to pass new school bond issues;
- the need to house students during renovations, asbestos abatement or upgrading of existing facilities;

- the introduction of new programs; and
- absence of acceptable alternatives to accommodate students such as year-round classes, double sessions, re-drawn boundaries, changing grade-facility configurations and relocations.

The inherent characteristics of a portable classroom often make them the optimum solution. Portable classrooms are easily relocatable and offer school districts maximum flexibility. Portable classrooms are built in a factory and can be delivered and installed in a short period of time. The initial capital outlay to purchase a portable classroom is less than permanent site-built construction. Moreover, portable classrooms can be leased with funds drawn from an operating budget as opposed to a capital budget. Portable classrooms offer a greater degree of privacy and independence for students which fosters a strong group identity. The portable classrooms are physically separated from each other and from the core school and open outdoors which promote programs that use the outdoors. In addition, portable classrooms represent a cost effective method to increase or decrease space incrementally.

Disadvantages of portable classrooms in the literature review were found to fall within three categories. The first is lack of visual appeal or poor aesthetic quality. The second is perceived inferior building quality. The third is that over time temporary portable classrooms become permanent.

Poor aesthetic quality was attributed to several factors. Most permanent classrooms were solicited by public school districts based upon minimum specifications to meet code. Amenities were stripped ostensibly for the sake of economy. The theory was the cheaper the classroom, the smaller the initial cash investment. Aesthetics also suffered from poor site planning. Portables were often situated over parking lots or playing fields eliminating important space. Physical separation of the classrooms contributed to lost travel time to the core building, exposure to inclement weather and difficulty in maintaining discipline.

Compounding the perception that portable classrooms are visually unpleasing is the further perception that the buildings are constructed of inferior materials. Portable classrooms in Florida at the time of the study were built to the southern building code and the Florida Department of Education standard 6A-2. These are the same regulations which govern so-called conventional or site built buildings. Perhaps the perception of inferior quality is the result of what many people feel the portable classrooms represent. For many adults, portable classrooms are perceived to be the result of poor planning and are contrary to the image of permanence and stability associated with their childhood school.

The maintenance program of the user is critical to the useful life of the portable classroom. Preventative maintenance for HVAC systems and periodic inspection of roofs, door jambs and tie downs an dramatically extend the useful life of the classrooms. It is more often than not poor maintenance which contributes to the perception of inferior quality rather than the choice of building materials.

Results of the Florida Study

Based on information gathered from facility planners, superintendents and teachers in each of the 67 public school districts in Florida, the study found:

- more than 16,000 portable classrooms in use (with some in every district);
- 53% primary schools; 27% secondary; 16% other academic such as adult education or vocational; and 3% non-academic such as storage, maintenance or food service;

- the average age of a portable classroom was 19 years ranging from new to 50 years old;
- regular maintenance by a skilled crew was found to be far more important to the useful life of a portable classroom than age; and
- the overwhelming reason to use portable classrooms was speed of delivery (35%) followed by shifting enrollments (26%) and the relatively inexpensive nature of the classrooms (25%).

The initial cost of a portable classroom was found to be between 36% and 77% of the cost of a site-built classroom addition. While less expensive at the outset, the critical issue was total cost of a portable classroom over life expectancy as compared to site built schools. Quite simply, "are portable classrooms a good investment?"

The Florida survey found portable classrooms to be a "good investment" relative to permanent construction if purchased (or leased) for a good price and properly maintained. The most compelling conclusion of the study, however, is that in light of continuing high rates of growth in enrollment levels and the expected weakness in the district's fiscal position, the use of portable classrooms will certainly expand in upcoming years. THE REPORT CLEARLY ESTABLISHES THAT PORTABLE CLASSROOMS ARE JUST AS EDUCATIONALLY EFFECTIVE AND COST EFFICIENT IN THE LONG RUN AS PERMANENT CLASSROOMS. In addition "[T]his study has found that the primary advantages of the portable classroom are its ability to provide flexible, suitable short-term accommodation to Florida's student population and its ability to provide that incrementally, in a timely and cost efficient fashion. . "

Since use of portable classrooms was found to be fiscally responsible, the report concluded with recommendations which address the primary complaint advanced against the classrooms - the lack of aesthetics. Better designs could extend life expectancy and make the portable classroom a "permanently used facility within the districts." Moreover, "the location of portable classrooms should be master planned at the time the architect is preparing the plans for a permanent school building ... included in this master plan should be the design of a covered walkway system that is integral to the design of the new facility being planned." Portable classrooms are a viable, cost effective solution to facility requirements and should be incorporated in the plans for all new schools. To be truly effective, portable classrooms should be a permanent part of facilities planning rather than an after-thought.

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"Virgin Islands Classroom Project"
Ramtech Building Systems

Project Start Date: March, 1996
Project Completion Date: November 1996

In September of 1995, Hurricane Marilyn struck the Virgin Islands. The storm devastated the island of St. Thomas. The island of St. Croix received only peripheral damage, but the hurricane destroyed all of the schools on both islands. Ramtech won the contract to provide modular classrooms to replace four elementary and two junior high schools within a short time frame. Most of the structures were typical classrooms, however, Ramtech also constructed administrative offices, fully equipped science labs and art rooms, libraries, cafeterias and separate restroom facilities. The Virgin Islands project required the demolition of existing structures, full site development, and the installation of over 128 new classrooms. All facilities had to meet 110 mph "Exposure D", as well as "Seismic Zone 4" building codes which required extensive foundation designs. All classrooms were joined via a complex, elevated interconnecting deck and ramp assembly due to the uneven terrain.

For more information on the Virgin Islands project, please contact Linc Moss at (800) 568-9376.

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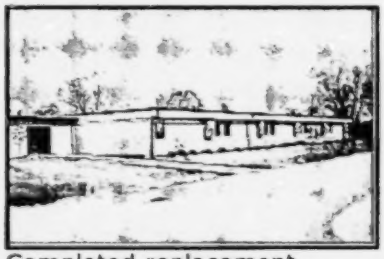
MBI Net > magazine > wscots98

"Rosewood, Ohio Project"
Williams Scotsman

The interior of the burned out building at Graham Elementary School.



Completed replacement facility at Graham Elementary School.

The Cincinnati Williams Scotsman Team was recruited to resolve an immediate need for classroom space in a small school district in Rosewood, Ohio. On Monday, December 30, 1996, a fire caused by a faulty extension cord destroyed a 9,000 square foot addition to Graham Elementary School. On Tuesday, December 31, Tom Frank, Service Manager for the Cincinnati branch, learned of the situation and quickly developed a plan to solve the space needs of the Graham School District. Ultimately, Williams Scotsman replaced the burned out addition with five 64'x24' classrooms. The new buildings were in place by the following Tuesday, in time for the Wednesday return of the students from their winter vacation.

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